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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/539,640

09/21/2006

Marc Lemaire

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7590 04/07/2008  
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EXAMINER

NWAONICHA, CHUKWUMA O

ART UNIT

PAPER NUMBER

1621

MAIL DATE

DELIVERY MODE

04/07/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/539,640	<b>Applicant(s)</b> LEMAIRE ET AL.	
	<b>Examiner</b> CHUKWUMA O. NWAONICHA	<b>Art Unit</b> 1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2008 and 16 January 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 65-95 is/are pending in the application.
- 4a) Of the above claim(s) 69-73 and 75-93 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 65-68, 94 and 95 is/are rejected.
- 7) ☒ Claim(s) 74 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### Current Status

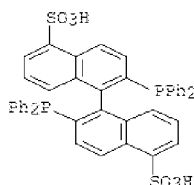
1. This action is responsive to Applicants' amendment of 7 January 2008 and 16 January 2008.
2. Receipt and entry of Applicants' amendment is acknowledged.
3. Claims 65-93 are pending.
4. The 112 rejection is withdrawn following Applicants amendment.
5. The objection of claim 74 for the reasons set forth in the previous Office Action of 07/05/07 is maintained.

The rejection of claims 65-68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamouille et al., {Hydrogenation of ethyl acetoacetate catalyzed by hydrosoluble BINAP derivatives, Tetrahedron Letters (2001), 42(4), 663-664}, Ter Hallea et al., {Synthesis and evaluation of poly-NAP-Ru, an heterogeneous enantioselective catalyst, Comptes Rendus de l'Academie des Sciences, Serie IIc: Chimie (2000), 3(7), 553-556} or Lemaire et al., {WO 2000049028 same as U.S. 6,610,875} for the reasons set forth in the previous Office Action of 07/05/07 is maintained.

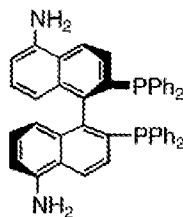
Applicants arguments filed 7 January 2008 have been fully considered but they are not persuasive. Applicants advise in their argument that it is difficult to introduce functional groups in the 5 and 5' positions of a binaphthyl molecule and that the presently claimed diphosphine cannot be obtained according to the processes known in the art. Applicants advise have been fully considered but the advise is not persuasive

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because prior arts have documented that functional groups can be introduced in the 5 and 5' positions of a binaphthyl molecule. For example, US 5,274,146 teach the compound shown below; wherein a functional group ( $\text{SO}_3\text{H}$ ) is substituted in the 5 and 5' positions of the binaphthyl molecule.



In another instant, Fan et al., {Preparation and use of MeO-PEG-supported chiral diphosphine ligands: soluble polymer-supported catalysts for asymmetric hydrogenation, *Tetrahedron: Asymmetry* (2001), 12(8), 1241-1247} teach the compound shown below; wherein a functional group ( $\text{NH}_2$ ) is substituted in the 5 and 5' positions of the binaphthyl molecule.



Applicants' should note that Lemaire et al. teach specifically the compounds; wherein functional groups ( $-\text{NC}$ ,  $-\text{CH}_2\text{NH}_2$  and  $-\text{COOH}$ ) are substituted in any of the positions in the binaphthyl molecule.

One of ordinary skill in the art would have a reasonable expectation of success in practicing the instant invention by varying the position of the substituents in the binaphthyl ring to arrive at the instantly claimed substituted diphosphine compounds.

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Additionally, the prior arts compounds are isomers of the claimed substituted diphosphine compounds of the general formula I, and isomers are obvious.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

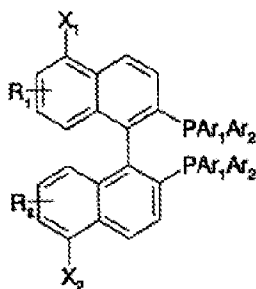
The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 65-68, 94 and 95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamouille et al., {Hydrogenation of ethyl acetoacetate catalyzed by hydrosoluble BINAP derivatives, Tetrahedron Letters (2001), 42(4), 663-664}, Ter Hallea et al., {Synthesis and evaluation of poly-NAP-Ru, an heterogeneous enantioselective catalyst, Comptes Rendus de l'Academie des Sciences, Serie IIc: Chimie (2000), 3(7), 553-556} or Lemaire et al., {WO 2000049028 same as U.S. 6,610,875}

Applicants claim a diphosphine compound of formula 1; wherein all the variables are as defined in the claims.



formula 1

**Determination of the scope and content of the prior art (M.P.E.P. §2141.01)**

Lamouille et al. teach a new Ru hydrosoluble BINAP derivative, [6,6'-bis(aminomethyl)-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl]ruthenium (II) dibromide dihydrobromide I. I was revealed to be enantioselective up to 94% and in the asymmetric hydrogenation of ethyl acetoacetate to ethyl (S)-3-hydroxybutanoate in a biphasic system. Poly(ethylene glycol)-substituted derivs. of 6,6'-bis(aminomethyl)-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl were also prepared; the ruthenium complexes were effective catalysts for the hydrogenation of ethyl acetoacetate with moderate enantioselectivity, but the catalysts underwent a significant drop in effectiveness upon reuse.. See page 663.

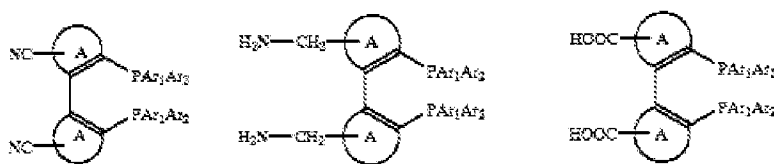
Ter Hallea et al. teach a heterogeneous catalyst was synthesized by polymerization of a BINAP derivative followed by complexation with ruthenium. This catalyst showed high enantioselectivities for the hydrogenation of various substrates such as dehydroaminoacids,  $\alpha$ -ketoesters, olefins,  $\beta$ -ketoesters and ketones. The

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catalyst may be re-used four times with negligible loss of enantioselectivity and activity.

See page 554.

Lemaire et al. teach a diphosphine compounds of the general formulas 2 wherein the variable A is an optionally substituted naphthly. See columns 1, 10 and 11.



formula 2

**Ascertainment of the difference between the prior art and the claims (M.P.E.P. §2141.02)**

Applicants claimed diphosphine compound of formula 1 differs from the diphosphine compounds taught by Lamouille et al., Ter Hallea et al. and Lemaire et al. in that applicants claimed diphosphine compound is an isomer (positional isomer) of those taught by prior art references cited. However, Lemaire et al. teach a diphosphine compound of formula 2 wherein the variable A is an optionally substituted naphthly while applicants claim a diphosphine compound of formula 1 wherein binaphthly group is substituted at the X<sub>1</sub> and X<sub>2</sub> positions.

**Finding of prima facie obviousness--rational and motivation (M.P.E.P. §2142-2143)**

The instantly claimed diphosphine compound of formula 1 would have been suggested to one of ordinary skill because one of ordinary skill wishing to produce a

reactive catalyst is taught to select the catalyst from the genus of Lamouille et al., Ter Hallea et al. or Lemaire et al.

One of ordinary skill in the art would have a reasonable expectation of success in practicing the instant invention by varying the substituents in the binaphthyl molecule of Lemaire et al. to arrive at the instantly claimed diphosphine compound of formula 1 for producing polymeric products. Said person would have been motivated to practice the teaching of the references cited because they demonstrate that diphosphine compounds are useful in organic synthesis. Additionally, the prior arts substituted diphosphine compounds are isomers of the claimed substituted diphosphine compounds of the general formula 1, and isomers are obvious. The instantly claimed invention would therefore have been obvious to one of ordinary skill in the art.

**THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chukwuma O. Nwaonicha whose telephone number is 571-272-2908. The examiner can normally be reached on Monday thru Friday, 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne (Bonnie) Eyler can be reached on 571-272-0871. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Chukwuma O. Nwaonicha/  
Examiner, Art Unit 1621

(for)

/Sikarl A. Witherspoon/  
Primary Examiner, Art Unit 1621

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Yvonne (Bonnie) Eyler  
Supervisory Patent Examiner,  
Technology Center 1600